NUI Galway
OÉ Gaillimh

Semester I Examinations 2011/ 2012

Exam Code(s)	4IF1
Exam(s)	B.Sc. in Information Technology
Module Code(s)	CT417
Module(s)	Software Engineering III
Paper No.	1
Repeat Paper	
External Examiner(s)	Prof. Michael O'Boyle
Internal Examiner(s)	Prof. G. Lyons Dr. Jim Duggan Dr. Owen Molloy * Dr. David O'Sullivan *
Instructions:	Candidates should attempt four questions, two questions from each section. All questions carry equal marks ***Use separate answer books for each Section***.
Duration	3 hours
No. of Pages	3

Requirements:
MCQ
Handout
Statistical/ Log Tables
Cambridge Tables
Graph Paper
Log Graph Paper
Other Materials

Release to Library: Yes ☐ No ☐

SECTION A

(Project Management – Dr. O'Sullivan)

All questions carry equal marks - 25. All sub-questions carry equal marks. Answer questions in the context of innovation within an IT organisation and use IT projects and ideas as examples throughout your answers.

1.
   a) Define innovation and explain its difference to invention
   b) Give one example of each of the following types of innovation: (i) product, (ii) process and (iii) service
   c) Give one example each of a radical innovation and an incremental innovation.
   d) Chris Anderson of Wired magazine explains 'technology trends'. Discuss.

2.
   a) Outline the process of defining goals for an IT organization.
   b) Explain the difference between rational and incremental goal definition.
   c) How do strategic objectives differ from performance indicators.
   d) Steven Johnson explains 'where ideas come from'. Discuss.

3.
   a) Outline the key stages of a project lifecycle with reference to the stage gate process.
   b) Explain the following expression: Risk = f (*event, probability, impact*)
   c) What are the six stages of the buyer experience life cycle?
   d) 'Being Wrong' can be positive. Why does Kathryn Schulz believe this?

4.
   a) What is a team and how does it differ from the term organisation and community?
   b) What things can organisations do to create a successful team environment?
   c) Name the four different types of teams that can be used for managing IT projects of varying strategic importance.
   d) Dan Pink explains 'employee motivation'. Are rewards important in his opinion?

SECTION B

(Software Quality – Dr. Molloy)

5. (a) You have been asked to develop an online banking application. Explain (using examples) how you would use a quality model (e.g. McCall's quality factors) to help you define the quality requirements for the product.

[10]

(b) Explain using examples the difference between Quality Assurance and Quality Control in the context of software development.

[5]

(c) Assuming a software project follows a standard waterfall life-cycle, give 2 examples of quality metrics would you recommend at each stage in the life-cycle, and explain how would you go about measuring them?

[10]

6. (a) You have been asked to initiate a project to improve productivity in a development team. Having decided to use the DMAIC approach, describe:

i. the main phases of the project
ii. the activities you would envisage as part of the project
iii. the tools you would use in each phase of the project

[15]

(b) You are developing a mobile app for managing business contacts, and are unsure which features to focus your efforts on (e.g. saving photos of business cards, integration with contacts, integration with email, synching with other mail systems, etc.). Describe how the Kano analysis method can be used to prioritise such requirements, and explain the procedure you would use to apply it.

[10]

7. (a) Explain the principles of *Lean thinking* and how they can be applied to software development.

[8]

(b) You have recently joined the QA team in a large software organisation. You have been asked to initiate a process for Code Reviews. Describe the following:

- The advantages of performing code reviews
- Potential issues which might be encountered
- The roles which you think should be filled in each review team
- How reviews should be conducted

[9]

(question continued overleaf)

(c) Explain the meaning of the following terms pertaining to the Scrum agile process:

- Sprint
- Product Backlog
- Daily Scrum
- Sprint Burndown

[8]

8. (a) You have noticed that there is a large degree of variability in the defect rates achieved by different development teams. Explain what the causes of this variability might be.

[7]

(b) Describe (using examples) how the following tools could be used in your analysis of the problem described in part (a) of this question:

- Fishbone Diagram
- Pareto Chart
- Histogram
- Scatter Chart
- Control Chart

[18]